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ABSTRACT

This teacher guide is part of the materials prepared for an individualized program for ninth-grade algebra and basic mathematics students. Materials written for the program are to be used with audiovisual lessons recorded on tape cassettes. For an evaluation of the program, see ED 086 545. In this guide, the teacher is provided with objectives for each topic area and guided to materials written for a given topic. Three short criterion tests are included for each topic covered. The content of this package includes number and set concepts. The number line is used to picture sets of numbers and to develop numbers concepts. This work was prepared under an ESEA Title III contract. (JP)

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ALGEBRA I

Package # 03-01

NUMBERS AND SETS

Prepared By

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Under a Grant From
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Numbers and Sets

Algebra is the study of sets of numbers and their properties. Algebra will enable you to solve problems in arithmetic by using letters in place of numbers. Algebra will also enable you to solve problems that might be impossible for you to solve by using only arithmetic.

Since Algebra is the study of sets of numbers, you must have an understanding of sets and an understanding of numbers if you are going to successfully undertake a study of algebra.

PACKAGE GOAL: To gain an adequate understanding of numbers and sets.

PACKAGE OBJECTIVES

1. Given a simple statement containing a ___?___, write =, ≠, or a numeral in place of ___?___ to make a true statement.

2. Given an expression or statement containing algebraic "punctuation" marks, write in simplified form or replace ___?___ with the proper symbol to obtain a true statement.

3. Given a number line, draw the graph of a given number or name the coordinate of a point described.

4. Given a sentence containing a ___?___, make a true statement by writing =, < , or > in place of ___?___ .

5. Given a set specified by roster, rule, or graph, specify the set by the other two methods when possible.

6. Given two sets A and B, identify the true statements in the following: $A \subseteq B$, $A \not\subseteq B$, $A \subset B$, $A = B$, A is finite, A is infinite, A and B are equivalent.

I. U. # 03-01-01

Naming Numbers; Equality and Inequality

You will need to recall that:

"=" or "is equal to" can be read as "is the same number as."

OBJECTIVES:

1. Given a statement such as $63 \div 7 \ \underline{?} \ 3 \times 3$, replace the $\underline{?}$ with one of the symbols $=$ or $\neq$ to make a true statement.

2. Given a statement such as $4 \div \underline{?} = \frac{1}{2}$, replace the $\underline{?}$ with a numeral to make a true statement.

3. Given a simple statement containing a $\underline{?}$, write $=$, $\neq$, or a numeral in place of $\underline{?}$ to make a true statement.

ACTIVITIES:

Study: S & M; pages 1 and 2 (objectives 1, 2, & 3)

Suggested exercises: S & M; page 3, ex. 1-12 (objective 1 & 3). S & M; page 3, ex. 13-24 (objectives 2 & 3).

Criterion Test 03-01-01-C2

1. Replace the ? with one of the symbols = or ≠ to make a true statement.

   (A) 8 × 0 ? 0 + 8
   (B) 6 ÷ 3 ? 3 × 1
   (C) 8 ÷ 2 ? 9 - 5

2. Replace the ? with a numeral to make a true statement.

   (A) 1 × ? = 5
   (B) 3 ÷ 1 ≠ ?
   (C) 6 × ? = 12 × 4

3. Replace the ? with =, ≠, or a numeral to make a true statement.

   (A) 48 ÷ 6 ? 24 × 3
   (B) ? - 5 = 38 - 2

Criterion Test 03-01-01-02

1. Replace the ? with one of the symbols = or ≠ to make a true statement.

   (A) 4 ÷ 2 ? 2 ÷ 4
   (B) 0 × 5 ? 0 + 0
   (C) 56 ÷ 8 ? 2 × 3

2. Replace the ? with a numeral to make a true statement.

   (A) 5 + 3 = 2 + ?
   (B) 7 × 8 ≠ 4 × ?
   (C) ? ÷ 5 ≠ 4

3. Replace the ? with =, ≠, or a numeral to make a true statement.

   (A) 5 × 3 ? 2 + 17
   (B) 5 + ? = 7 + 12

Criterion Test 03-01-01-03

1. Replace the ___?___ with one of the symbols = or ≠ to make a true statement.

   (A) 12×2 ___?___ $26 - 2$
   (B) 5×4 ___?___ $2 + 10$
   (C) $0.7 + 0.3$ ___?___ $2 \times \frac{1}{2}$

2. Replace the ___?___ with a numeral to make a true statement.

   (A) $8 + 2 = 4 +$ ___?___
   (B) $3 \times$ ___?___ $\neq 9 \times 6$
   (C) $24 \div$ ___?___ $= 12$

3. Replace the ___?___ with a numeral to make a true statement. or symbol

   (A) $4 \times$ ___?___ $\neq 12 \div 3$
   (B) $3 \div 1$ ___?___ 1×3

Answers to Criterion Tests

Criterion Test 03-01-01-01

1. (A) ≠ (B) ≠ (C) =

2. (A) 5 (B) any number except three (C) 8

3. (A) ≠ (B) 41

Criterion Test 03-01-01-02

1. (A) ≠ (B) = (C) ≠

2. (A) 6 (B) any number except 14
(C) any number except 20

3. (A) ≠ (B) 14

Criterion Test 03-01-01-03

1. (A) = (B) ≠ (C) =

2. (A) 6 (B) any number except 18 (C) 2

3. (A) any number except 1 (B) =

I. U. # 03-01-02

Punctuation Marks in Algebra

OBJECTIVES:

1. Given the symbols ( ), [ ], { }, and ——, write their names.

2. When asked to state the substitution principle, you will write it.

3. Given an expression containing symbols of grouping, simplify it.

4. Given an expression containing symbols of grouping and a ___?___, replace the ___?___ with = or ≠ to make a true statement.

5. Given an expression or statement containing algebraic "punctuation" marks, write in simplified form or replace ___?___ with the proper symbol to obtain a true statement.

ACTIVITIES:

Study: S & M: pages 3,4,& 5 (objective 1-5)

Suggested exercises:
S & M: page 6; ex. 1-11, odd (objectives 3,5)
S & M: page 6; ex. 13-27, odd (objectives 4,5)

Criterion Test 03-01-02-01

1. Write the name of each of the following symbols.

   (A) ( ) (B) { } (C) [ ] (D) ——

2. State the substitution principle.

3. Simplify each of the following expressions.

   (A) $(12 \times 12) \div (3 \times 4)$ (B) $\frac{4 + (6 \div 2)}{[3 + 4]} + 1$

4. Make a true statement by replacing each ? with one of the symbols = or ≠.

   (A) $\frac{14 \times 5}{4 + 1}$? $(56 \div 4)$ (B) $32 \div (8 - 4)$? $(6+2)-8$

5. Replace ? with = or ≠ to make a true statement or simplify if expression does not contain a ?.

   (A) $[2\times3]+6$? $(48\div2)\div2$
   (B) $[8+\{13-(2\times5)\}]+10$
   (C) $[6\times(4+7)-(9+2)]-50$
   (D) $\frac{(6\times8)-8}{(36\div2)+2} + 2$? $1+\frac{30-3}{1+4}$

Criterion Test 03-01-02-02

1. Write the name of each of the following symbols.

   (A) [ ] (B) —— (C) { } (D) ( )

2. State the substitution principle.

3. Simplify each of the following expressions.

   (A) $(8 \times 3) \div (36 \div 9)$ (B) $2+\frac{7+(6\div 3)}{2+1}$

4. Make a true statement by replacing each ? with one of the symbols = or ≠.

   (A) $\frac{8\times 5}{(4\times 1)+1}$? (2×4)

   (B) $24\div(6+2)$? $(14-8)\times 1$

5. Replace ? with = or ≠ to make a true statement or simplify if the expression does not contain ?.

   (A) $(48\div 2)\div 2$? $[2\times 3]+6$

   (B) $[9+\{12-(2\times 3)\}]+5$

   (C) $[4\times(3+2)-(8-3)]+45$

   (D) $\frac{(7\times 4)-6}{7+4}+3$? $3+\frac{33-7}{9+4}$

Criterion Test 03-01-02-03

1. Write the name of each of the following symbols.

   (A) ___ (B) ( ) (C) [ ] (D) { }

2. State the substitution principle.

3. Simplify each of the following expressions.

   (A) $(9 \times 8) \div (3 \times 2)$ (B) $\frac{8+(9 \div 3)}{(19+3)} + \frac{1}{2}$

4. Make a true statement by replacing each ? with one of the symbols = or ≠.

   (A) $\frac{12 \times 11}{(6-2)}$? $(9+2)$

   (B) $96 \div (12 \times 2)$? $(6+2)+8$

5. Replace ? with = or ≠ to make a true statement or simplify if the expression does not contain a ?.

   (A) $6+[2 \times 3]$? $(48 \div 2) \div 2$

   (B) $[14+\{22-(3 \times 7)\}]+9$

   (C) $[6 \times (3+8)-(8 \div 2)]-2$

   (D) $\frac{(5 \times 8)-4}{(2 \times 2)} + 1$? $2+\frac{40-20}{5 \times 1}$

Answers to Criterion Tests

Test 03-01-02-01

1. (A) parentheses
   (B) braces
   (C) brackets
   (D) bar or fraction bar

2. Changing the numeral by which a number is named in an expression does not change the value of the expression.

3. (A) 12 (B) 2

4. (A) = (B) ≠

5. (A) = (B) 21 (C) 5 (D) ≠

Test 03-01-02-02

1. (A) brackets
   (B) bar or fraction bar
   (C) braces
   (D) parentheses

2. Same as 2 in Criterion Test 1.

3. (A) 6 (B) 5

4. (A) = (B) ≠

5. (A) = (B) 20 (C) 60 (D) =

Answers to Criterion Tests

Test 03-01-02-03

1. (A) bar or fraction bar
   (B) parentheses
   (C) brackets
   (D) braces

2. Same as 2 in Criterion Test 1.

3. (A) 12 (B) 1

4. (A) $\neq$ (B) $\neq$

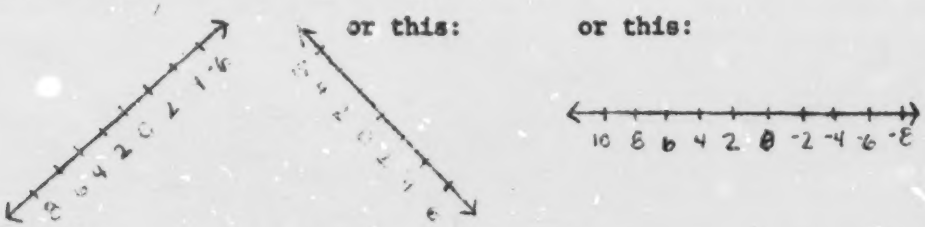
5. (A) = (B) 24 (C) 60 (D) $\neq$

I. U. # 03-01-03

The Number Line

You will need to recall that:

1. The orientation (location and direction) of a sketch of the number line is arbitrary. For example, a number line can properly be sketched like this:



2. A uniform scale is required on a sketch of a number line (the distance between any two consecutive members of the set $\{\ldots,-3,-2,-1,0,1,2,3,\ldots\}$ must be the same as the distance between any other two consecutive members of the set.

3. The distance mentioned in (2) above can be <u>any</u> distance as long as it remains uniform for any given number line.

4. Any portion of the number line can be pictured in a sketch. The origin (0) need not be included. Examples:

OBJECTIVES:

1. Given a set of numbers, draw a sketch of the number line and graph the numbers.

2. Given a number line, name the coordinate of a point described.

3. Given a number line, draw the graph of a given number or name the coordinate of a point described.

ACTIVITIES:

Study: S & M: pages 8 and 9 (objectives 1-3)

Suggested exercises
S & M: page 10; ex. 1-8 (objective 1 and 3)
S & M: page 11-12; 1-25, odd (objective 2 & 3)

Criterion Test 03-01-03-01

1. Sketch a number line and graph the set of numbers.

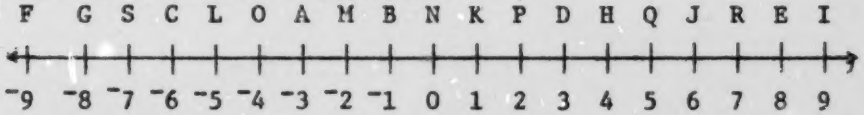
   (A) {2, $^{-}$1.5 }
   (B) {$^{-}$20, $^{-}$17 }

2. Name the coordinate on the number line of the point described.

   (A) Start at the origin, move eight units in the negative direction, then three in the positive direction.

   (B) The point 7 units to the right of $^{-}$5.

3. Refer to the number line below and name the coordinate of each described.



   (A) The point three units to the left of R.
   (B) The point 10 1/2 units to the right of $^{-}$7.
   (C) The point 2/3 of the distance from $^{-}$3 to 3.

Criterion Test 03-01-03-02

1. Sketch a number line and graph the set of numbers.

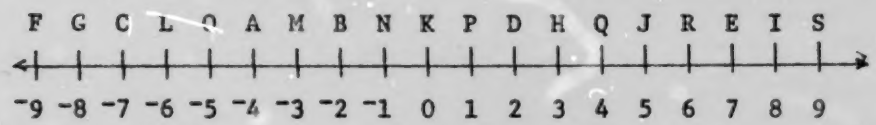
   (A) {3, $^{-}$2.5}
   (B) {43, 48}

2. Name the coordinate on the number line of the point described.

   (A) Start at the origin, move 3 units in the positive direction, then 7 units in the negative direction.

   (B) The point 6 units to the left of $^{-}$3.

3. Refer to the number line below and name the coordinate of each point described.



   (A) The point 8 units to the right of A.
   (B) The point 4.5 units to the left of P
   (C) The point 3/4 of the distance from C to P.

Criterion Test 03-01-03-03

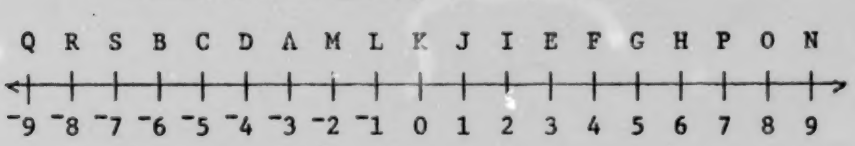
1. Sketch a number line and graph the set of numbers:

   (A) {2, $^{-}$4.5}
   (B) {29, 26}

2. Name the coordinate on the number line of the point described.

   (A) Start at the origin, move 2 units to the left, then 10 units to the right.
   (B) The point 3 units to the right of 0.

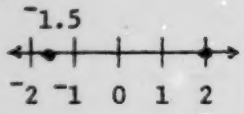
3. Refer to the number line below and name the coordinate of each point described.

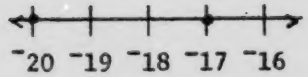


   (A) the point 5 units to the left of L.
   (B) the point 3.5 units to the right of 7.
   (C) the point 1/3 of the distance from D to G.

Answers to Criterion Tests

Test 03-01-03-01

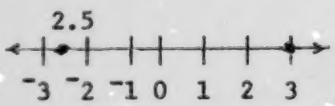
1. (A) 

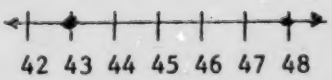
(B) 

2. (A) -5 (B) 2

3. (A) 4 (B) 3.5 (C) 1

Test 03-01-03-02

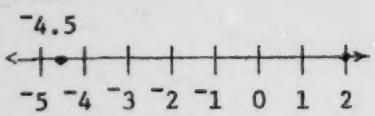
1. (A) 

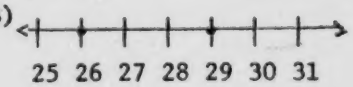
(B) 

2. (A) -4 (B) -9

3. (A) 4 (B) -3.5 (C) -1

Test 03-01-03-03

1. (A) 

(B) 

2. (A) 8 (B) 3

3. (B) -6 (B) 10.5 (C) -1

I. U. # 03-01-04

Comparing Numbers

OBJECTIVES:

1. Given a sentence containing a ___?___, make a true statement by writing =, <, or > in place of ___?___.

ACTIVITIES:

Study: S & M: pages 12-14 (objective 1)

Suggested exercises:

S & M: pages 14-15; oral exercises 1-16 and written exercises 1-20.

Criterion Test 03-01-04-01

1. Replace ? with one of the symbols =, <, > to make a true statement.

(A) $5 \div 5$? 0
(B) $1/4 \times 4$? 3
(C) $5 \times 1/2$? 3
(D) 0×4 ? $^{-}3$
(E) $1/5 \times 4$? 5/4
(F) 3 ? 4 ? 4

Criterion Test 03-01-04-02

1. Replace ? with one of the symbols =, < , > to make a true statement.

(A) $6 + 2$? $2 + 6$
(B) $13 - 5$? 0
(C) $6 \div 3$? $18 \times 1/9$
(D) $16 - 6$? 6×2
(E) $^{-}2/5$? $^{-}3/5$? $^{-}4/5$
(F) 9×4 ? 5×7

Criterion Test 03-01-04-03

1. Replace ? with one of the symbols =, < , or > to make a true statement.

(A) $8 \div 8$? 1
(B) $3/2 \times 8$? 11
(C) 4×8 ? 11×3
(D) $^{-}16$? $^{-}15$? $^{-}12$
(E) 57×13 ? 12×57
(F) $\frac{10 + 3}{2}$? $^{-}1$

Answers to Criterion Tests

Test 03-01-04-01

1. (A) >
   (B) <
   (C) <
   (D) >
   (E) <
   (F) < =

Test 03-01-04-02

1. (A) =
   (B) >
   (C) =
   (D) <
   (E) > >
   (F) >

Test 03-01-04-03

1. (A) =
   (B) >
   (C) <
   (D) < <
   (E) >
   (F) >

I. U. # 03-01-05

Specifying Sets

OBJECTIVES:

1. Given a non-empty set, specify it by roster, if possible.

2. Given a set, specify the set by rule.

3. Given a set of numbers, specify the set by graph.

4. Given a set specified by roster, rule, or graph, specify the set by the other two methods, if possible.

ACTIVITIES:

Study: You must understand the meanings of $\{\ \}$, $\emptyset$, $\{0\}$, $\{\emptyset\}$. $\{\ \}$ and $\emptyset$ are symbols for the empty set (the null set); that is, the set that has no members. $\{0\}$ is <u>not</u> the empty set because it has one member which is 0. $\{\emptyset\}$ is <u>not</u> the empty set because it has one member. That member is the empty set.

<u>S & M</u>: pages 16-18 (objective 1-4)
pages 21-22, beginning with paragraph 4, page 21 (objective 1-4)

Suggested exercises: There are different correct ways of graphing sets of numbers on the number line. Please use the method illustrated in your textbook. This way we can get uniformity of answers. Thank you.

<u>S & M</u>: page 19; ex. 1-5, odd (objectives 1 and 4).
page 23; ex. 1-7, odd-give only the roster (objectives 1 and 4).
page 19; ex. 7-11, odd (objectives 2 and 4).
page 24; ex. 9-13, odd (objectives 2 and 4).
pages 19-20; ex. 13-25, odd (objectives 3 and 4).
page 24; ex. 15 and 17 (objective 3 and 4).

Criterion Test 03-01-05-01

1. Specify each set by roster.

   (A) {the last three days of the week}
   (B) {the odd integers between $^{-}7$ and 3, inclusive}

2. Specify each set by rule.

   (A) {January, February, March}
   (B) {0, $^{-}1$, $^{-}2$, ..., $^{-}10$}

3. Draw the graph of each set.

   (A) {the real numbers between $^{-}3$ and 2}
   (B) {the negative integers greater than or equal to $^{-}5$}

4. Identify each set by its specification (roster, rule, or graph). Then specify the set in at least one other way; two ways when possible.

   (A) {the even integers between $^{-}3$ and 1}
   (B) {1,3,5,7,9,...}
   (C) {all of the states of the U. S. with greater area than Texas}

Criterion Test 03-01-05-02

1. Specify each set by roster.

   (A) {the months of the year that begin with the letter M}
   (B) {the even integers greater than $^{-}2$}

2. Specify each set by rule.

   (A) {Alaska, Hawaii}
   (B) {8,9,10,... 14}

3. Draw the graph of each set.

   (A) {the positive odd integers}
   (B) {the positive even integers less than 8}

4. Identify each set by its specification (roster, rule, or graph). Then specify the set in at least one other way; two ways when possible.

   (A) {the odd integers between $^{-}5$ and 4}
   (B) {$^{-}2,0,2,4$}
   (C) {Omaha, Lincoln}

Criterion Test 03-01-05-03

1. Specify each set by roster.

   (A) {the last seven letters of the alphabet}
   (B) {the even integers between $^{-}8$ and $^{+}8$}

2. Specify each set by rule.

   (A) {a,e,i,o,u}
   (B) {$^{-}3,^{-}1,1,3,5$}

3. Draw the graph of each set.

   (A) {the real numbers between $^{-}2$ and 3}
   (B) {the positive integers less than or equal to 5}

4. Identify each set by its specification (roster, rule, or graph). Then specify the set in at least one other way; two ways when possible.

   (A) {the even integers between $^{-}4$ and 5}
   (B) {$^{-}2,^{-}1,0,1,2,3,$}
   (C) {South Dakota, Iowa, Missouri, Kansas, Colorado, Wyoming}

Answers to Criterion Tests

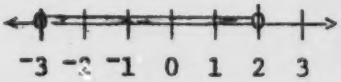
Some of the rules can be stated differently. If you're not sure about your answer, ask your teacher.

Test 03-01-05-01

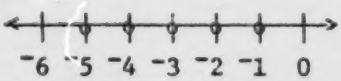
1. (A) {Thursday, Friday, Saturday}
   (B) {$^{-}7, ^{-}5, ^{-}3, ^{-}1, 1, 3$}

2. (A) {the first three months of the year}
   (B) {the non-positive integers greater than or equal to $^{-}10$} or {the integers between $^{-}10$ and 0, inclusive}

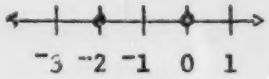
3. (A)



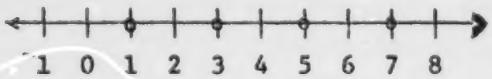
   (B)



4. (A) rule, {$^{-}2, 0$}



   (B) roster, {positive odd integers}



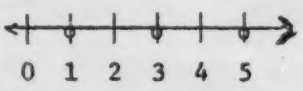
   (C) rule, {Alaska}

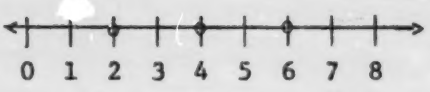
Some of the rules can be stated differently. If you're not sure about your answer, ask your teacher.

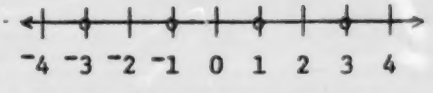
Test 03-01-05-02

1. (A) {March, May}
   (B) {0,2,4,6,...}

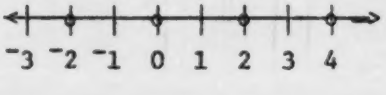
2. (A) {the last two states to be admitted to the Union}
   (B) {the integers between 8 and 14, inclusive}

3. (A) 

   (B) 

4. (A) rule, {⁻3,⁻1, 1, 3} 

   (B) roster, {the even integers between ⁻2 and 4, inclusive}



   (C) roster, {the two largest cities in Nebraska}

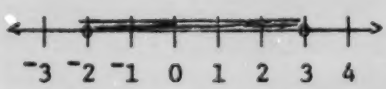
Some of the rules can be stated differently. If you're not sure about your answer, ask your teacher.

Test 03-01-05-03

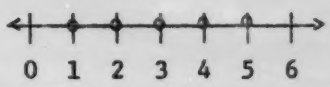
1. (A) {t,u,v,w,x,y,z}
   (B) {$^{-}6, ^{-}4, ^{-}2$, 0, 2, 4, 6}

2. (A) {the vowels}
   (B) {the odd integers between $^{-}3$ and 5, inclusive}

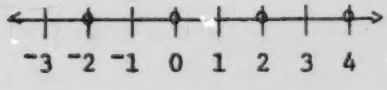
3. (A)



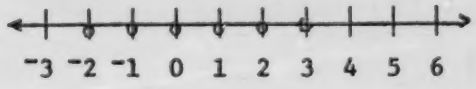
   (B)



4. (A) rule, {$^{-}2$, 0, 2, 4}



   (B) roster, {the integers between $^{-}2$ and 3, inclusive}



   (C) rule, {the states that border Nebraska}

I. U. # 03-01-06

Comparing Sets

OBJECTIVES

1. Given two sets A and B, determine if $A \subseteq B$.
2. Given two sets A and B, determine if $A \subset B$.
3. Given two sets A and B, determine if $A = B$.
4. Given two sets A and B, determine if A and B are equivalent.

I. U. # 03-01-06

5. Given a set A, indicate whether A is finite or infinite.
6. Given two sets A and B, identify the true statements in the following: $A \subseteq B$, $A \not\subseteq B$, $A \subset B$, $A = B$, A is finite, A is infinite, A and B are equivalent.

ACTIVITIES: Comparing Sets

Study:

HBJ: pages 6 - 9. (Objectives 1, 2, 3, 6)

HBJ: page 12 (Objectives 4, 6)

S+M: pages 20 - 23 (Objectives 3, 5, 6)

Suggested exercises:

HBJ: page 10: ex. 12 - 23 and 34 - 43. (Objectives 1, 2, 3, 6)

HBJ: page 15 ex. 1 - 11. (Objectives 4, 5, 6)

Criterion Test 03-01-06-01

1. Is A $\subseteq$ B?

   (a) A = {all the odd integers}
   B = {1,3,5,7,...}

   (b) A = {2,4,6,8 }
   B = {4,8,6,2 }

2. Is A $\subset$ B?

   (a) A = {all the odd integers}
   B = {1,3,5,7, ...}

   (b) A = {2,4,6,8}
   B = {4,8,6,2}

   (c) A = {1,3,5,7, ...}
   B = {1,2,3,4, ...}

3. Is A = B?

   (a) A = {all the odd integers}
   B = {1,3,5,7, ...}

   (b) A = {2,4,6,8}
   B = {4,8,6,2}

   (c) A = {1,3,5,7, ...}
   B = {1,2,3,4, ...}

4. Are A and B equivalent?

   (a) A = {all the odd integers}
   B = {1,3,5,7, ...}

   (b) A = {2,4,6,8}
   B = {4,8,6,2}

   (c) A = {1,3,5,7, ...}
   B = {1,2,3,4, ...}

5. Indicate whether each set is finite or infinite.

   (a) {the real numbers between 5 and 8}
   (b) {2,4,6,8,10}
   (c) {the odd integers between $^{-}$7 and 5}

Test 03-01-06-01 (Continued)

6. h. $A \subseteq B$ i. $A \not\subseteq B$ j. $A \subset B$ k. $A = B$

l. A is finite m. A is infinite

n. A and B are equivalent

Indicate which of the above statements are true for each exercise below.

(a) $A = \{1,2,3\}$
$B = \{3,1,2\}$

(b) $A = \{0,2,4,6, \ldots\}$
$B = \{\text{the integers}\}$

(c) $A = \{1,5,7,9\}$
$B = \{2,4,6,8\}$

Test 03-01-06-02

1. Is $A \subseteq B$?

(a) $A = \{\text{all the even integers}\}$
$B = \{2,4,6,8, \ldots\}$

(b) $A = \{1,3,5,7\}$
$B = \{3,7,5,1\}$

2. Is $A \subset B$?

(a) $A = \{\text{all the even integers}\}$
$B = \{2,4,6,8, \ldots\}$

(b) $A = \{1,3,5,7\}$
$B = \{3,7,5,1\}$

(c) $A = \{3,6,9,12, \ldots\}$
$B = \{1,2,3,4, \ldots\}$

3. Is $A = B$?

(a) $A = \{\text{all the even integers}\}$
$B = \{2,4,6,8, \ldots\}$

(b) $A = \{1,3,5,7\}$
$B = \{3,7,5,1\}$

(c) $A = \{3,6,9,12, \ldots\}$
$B = \{1,2,3,4, \ldots\}$

Test 03-01-06-02 (Continued)

4. Are A and B equivalent?

   (a) A = {all the even integers}
       B = {2,4,6,8, ...}

   (b) A = {1,3,5,7}
       B = {3,7,5,1}

   (c) A = {3,6,9,12, ...}
       B = {1,2,3,4, ...}

5. Indicate whether each set is finite or infinite.

   (a) {the real numbers between $^-6$ and $^-2$}
   (b) {1,3,5,7,9}
   (c) {the even integers between $^-2$ and 0}

6. h. $A \subseteq B$ i. $A \nsubseteq B$ j. $A \subset B$ k. $A = B$

   l. A is finite m. A is infinite

   n. A and B are equivalent

   Indicate which of the above statements are true for each exercise below.

   (a) A = {2,4,6}
       B = {4,6,2}

   (b) A = {0,1,3,5, ...}
       B = {the integers}

   (c) A = {2,4,6,8}
       B = {1,5,11,10}

Test 03-01-06-03

1. Is $A \subseteq B$?

   (a) A = {the counting numbers}
       B = {1,2,3,4, ...}

   (b) A = {1,2,3,4,5}
       B = {2,3,4}

Criterion Test 03-01-06-03 (Continued)

2. Is $A \subset B$?

   (a) A = {the counting numbers}
   B = {1,2,3,4, ...}

   (b) A = {1,2,3,4,5}
   B = {2,3,4}

   (c) A = {3,9,12,15, ...}
   B = {the natural numbers}

3. is A=B?

   (a) A = {the counting numbers}
   B = {1,2,3,4, ...}

   (b) A = {3,9,12,15, ..}
   B = {the natural numbers}

   (c) A = {1,2,3,4,5}
   B = {2,3,4}

4. Are A and B equivalent?

   (a) A = {the counting numbers}
   B = {1,2,3,4, ...}

   (b) A = {3,9,12,15, ...}
   B = {the natural numbers}

   (c) A = {1,2,3,4,5}
   B = {2,3,4}

5. Indicate whether each set is finite or infinite.

   (a) {the real numbers between 4 and 11}
   (b) {$^-$3,$^-$2,$^-$1, 0}
   (c) {the natural numbers between 8 and 10}

6. h. $A \subset B$ i. $A \not\subset B$ j. $A \subset B$ k. A = B

   l. A is finite m. A is infinite

   n. A and B are equivalent

   Indicate which of the above statements are true for each exercise below.

   (a) A = {8,9,10} B = {10,8,9}
   (b) A = {0,4,8,12, ...} B = {the integers}
   (c) A = {19,20,21} B = {20,21,18}

Answers to Criterion Tests

Test 03-01-06-01

1.	a. no	b. yes	
2.	a. no	b. no	c. yes
3.	a. no	b. yes	c. no
4.	a. yes	b. yes	c. yes
5.	a. infinite	b. finite	c. finite
6.	a. h,k,l,n	b. h,j,m,n	c. i,l,n

Test 03-01-06-02

1.	a. no	b. yes	
2.	a. no	b. no	c. yes
3.	a. no	b. yes	c. no
4.	a. yes	b. yes	c. yes
5.	a. infinite	b. finite	c. finite
6.	a. h,k,l,n	b. h,j,m,n	c. i,l,n

Test 03-01-06-03

1.	a. yes	b. no	
2.	a. no	b. no	c. yes
3.	a. yes	b. no	c. no
4.	a. yes	b. yes	c. no
5.	a. infinite	b. finite	c. finite
6.	a. h,k,l,n	b. h,j,m,n	c. i,l,n

END OF PACKAGE 03-01